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(71) Applicant: PLANTRONICS, INC. [US/US]; 337 Encinal Street, P.O. Box 1802, Santa Cruz, CA 95061-1802 (US).

(72) Inventors: BUNGARDT, Gabriele; 141 Belmont Street, Santa Cruz, CA 95060 (US). PEDRAZA, Luis; 459 Huntington Avenue, Hyde Park, MA 02136 (US). GOODRICH, Betsy; 112 Beach Street, Roslindale, MA 02131 (US). MORRISSEY, Edmund, J., III; 10153 Soquel Drive, Aptos, CA 95003-4927 (US).

(74) Agents: SMITH, Albert, C. et al.; Fenwick & West, Suite 600, Two Palo Alto Square, Palo Alto, CA 94306 (US).

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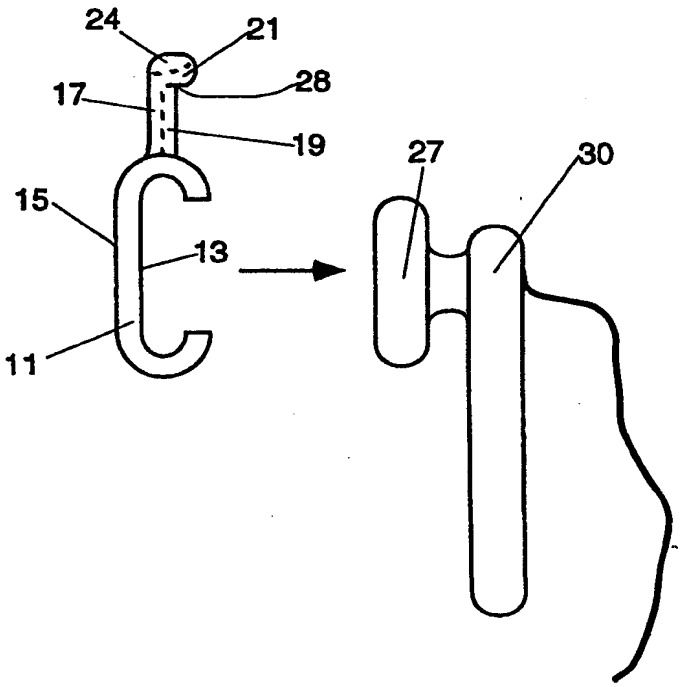
(54) Title: CONCHA HEADSET STABILIZER

(57) Abstract

An apparatus for stabilizing a concha style headset comprises a receiver attachment that couples to the body of the receiver of the headset, a flexible and resilient support member extending from the receiver attachment, and a concha stabilizer pad coupled to the end of the support member, such that the concha stabilizer pad contacts the upper concha under the antihelix of the ear with the receiver placed in the lower concha in front of the ear canal. The receiver attachment can include a foam ear cushion that covers the portion of the receiver that is placed in the lower concha, with the concha stabilizer pad and the flexible support member formed of a compressed cellular foam. Support ribs extend from the upper surface of the ear cushion along the surface of the support member and join the concha stabilizer pad. Alternatively, the receiver attachment can include retaining members that engage in mounting holes in the receiver, and may include curved members which wrap around the body of the receiver when the retaining members mount the underside of the receiver. The support member can then include a flexible arch or stalk, with the concha stabilizer pad (or torus) located at the top of the arch.



CONCHA HEADSET STABILIZER

Background of the Invention

Field of Invention

The invention relates generally to the design of headsets, and more particularly, to an apparatus for stabilizing such headsets.

Description of the Background Art

A concha style headset is a device for transmitting received sounds to the ear of the user by means of a small receiver which is sized to fit in the lower concha in front of the ear canal. In telecommunication headsets, a tubular extension or a voice tube is often coupled to the receiver and extends down and towards the user's mouth for receiving the user's voice and transmitting it over a telecommunications line. Conventional earbud concha style headsets position the receiver inside the lower concha between the tragus and anti-tragus to establish placement and support on the ear. However, different ear shapes and sizes make it difficult for a single design to both fit the ear correctly and to stabilize the headset. Accordingly, the receiver is typically held in place by mechanical devices which fit around the outside of the ear, or around the head. These devices add mechanical complexity, which decreases ease of use, and increases the cost of manufacturing. Mechanical stabilizers also increase the size and weight of the headset, resulting in increased fatigue from prolonged use.

One example of such mechanical stabilizers is the ear hook. An ear hook is a large semicircular component that fits around the top of the ear between the helix and the side of the head. The receiver is then attached to the body of the ear hook, and held in the lower concha in front of the ear canal, or it can be coupled to the receiver with a flexible tube and placed into the lower concha. The ear hook presents three disadvantages. First, an ear hook is awkward and time consuming to place on the ear because of the need to manually position the ear hook. Second, the ear hook does not

Another portion of the foam piece forms a supporting foam member that extends from the top of the ear cushion to a concha stabilizer pad that rests against the upper concha. The supporting member is elongated and flexible, providing a spring hinge-like action which automatically adjusts the stabilizer to the size and shape of the upper concha, while providing sufficient force to hold the receiver against the lower concha.

Alternatively, the stabilizer is formed from an arch that connects to a receiver, and is disposed upward from the receiver. A concha stabilizer pad is secured to the top of the arch and provides a contact point when inserted into the upper concha. The arch is resilient to provide tension to the upper concha through the foam pad, thereby stabilizing the receiver in the ear. The resilient arch can be formed of wire, an elastomeric compound, or the like. In another alternate embodiment the stabilizer is formed as a torus (ring shape) that is coupled to a stalk shaped supporting member.

The simple design and absence of mechanical parts results in several benefits. The concha stabilizer permits fast and easy one-handed insertion and removal, without the need for repeated adjustment. The concha stabilizer maintains the receiver in the lower concha, ensuring proper placement and eliminating the need for frequent readjustment. The concha stabilizer is self-adjusting with no additional mechanical parts, and is symmetrical for either ear. The small form factor increases wearability, and decreases fatigue. Further, manufacturing costs are also reduced. The design of the concha stabilizer is readily adaptable and applicable to a variety of existing headsets which use an ear cushion, thereby allowing use of the present invention with no need for redesign.

Brief Description of the Drawings

Figure 1 is an illustration of the concha stabilizer, with Figure 1B showing a sectional view of the concha stabilizer of Figure 1A.

Description of the Preferred Embodiment

The present invention for stabilizing a concha style headset includes a receiver attachment that couples to the receiver, a flexible stabilizer support member that couples to the receiver attachment and extends away from the receiver attachment and toward the upper concha with the receiver placed in the ear, and a concha stabilizer pad mounted at the end or top of the support member, for contacting the upper concha below the antihelix.

Figure 1 shows an embodiment of the invention for stabilizing a concha style headset typically including a receiver **27** and a voice tube **30**. A receiver attachment comprises an ear cushion **11** preferably dimensioned as an oblate spheroid, formed of a reticulated, fully open-pore flexible, ester type polyurethane foam. A suitable foam is the P100 foam commercially available from Illbruck Inc.. The foam has a density of approximately 1.75 lbs/ft^3, provides a minimum restriction to air flow, and is functionally transparent to the transmission of sound from the receiver **27**. The ear cushion **11** has an open central recessed portion **13** forming a "C" shape, which is dimensioned to fit snugly onto the receiver **27**. When placed into the lower concha **41** (Figure 3), the ear cushion **11** contacts the tragus **35** and the antitragus **39** at a tragus contact point **23** and an antitragus contact point **25**, respectively, where the face **15** of the ear cushion **11** rests in the lower concha **41** and faces toward the ear canal **33**. The left/right orientation of the tragus contact point **23** and the antitragus contact point **25** with respect to the face **15** of the ear cushion **11** is reversed for the left and right ears.

Extending from the upper surface of the ear cushion **11** is a flexible support member, here a stabilizer support **17**. The stabilizer support **17** is an open cell foam which has been compressed to become sufficiently rigid to provide both flexibility for, and resistance to, positional deformation. The foam can be the same as that used for the ear cushion, compressed approximately 1.74:1 using conventional techniques, yielding an approximate effective density of 9.29 lbs/ft^3. The end of the stabilizer

Figures 2A, 2B, and 2C show three alternative embodiments of the present invention. In all embodiments, the receiver attachment is integral with the support member, and is coupled to a concha stabilizer pad. In the embodiment of Figure 2A the receiver attachment comprises curved members **51a** which are dimensioned to curve around the body of the receiver **27**. The curved members **51a** have retaining members **53a** which engage the underside of the receiver **27** in holes adapted to receive such retaining members **53a**, thereby securing the curved members **51a** to the receiver **27**. Integral with, and coupling between the curved members **51a**, is a curved support arch **55a** which extends upwards and away from the receiver **27**. The top portion **59a** of the support arch **55a** is coupled to a concha stabilizer pad **57a**, which functions as described above.

Figure 2B shows another alternative embodiment in which the receiver attachment is formed with only retaining members **53b** for mounting in holes in the upper surface of the receiver **27** adapted to receive such retaining members **53b**. Integral with, and coupling between the retaining members **53b**, is a curved support arch **55b** which extends upward and away from the receiver **27**. The top portion **59b** of the support arch **55b** is coupled to a concha stabilizer pad **57b**, which functions as described above.

In the embodiments of Figures 2A and 2B the support arch **55** provides the support for the concha stabilizer pad **57**, and provides sufficient tension to maintain the concha stabilizer pad **57** against the upper concha **43** during use. In these embodiments the arch **55** and its integral portions **59** and members **53**, **55** can be formed of wire, an elastomeric compound, or the like.

Figure 2C shows another alternative embodiment in which the receiver attachment comprises the end portion **53c** of a compressed foam support stalk **55c**, which can be also made of a rigid plastic material. Along the length of the support stalk **55c** are support ribs **61c** which increase the rigidity and durability of the support

Appendix

Figure 3 shows a typical human ear. The outer ear, or pinna, is an irregularly concave cartilaginous member comprised of a number of eminences and depressions which give each ear a distinct shape and form. The helix **29** is the curved outer rim of the ear; below the helix **29** is the antihelix **45**, a curved prominence which describes a curve around the concha, a deep cavity containing the entry to the ear canal **33**. The concha is divided into two parts, the upper and lower concha **41**, **43**, by the crux of the helix **31** which curves around the outside of the ear, and extends inwards at about the vertical midpoint of the ear. The upper concha **43** lies above the crux of the helix **31** and below the anti-helix **45**; the lower concha **41** lies below the crux of the helix **31** and surrounds the entry to the ear canal **33**. In front of the lower concha **41** and projecting backwards from the front of the ear is the tragus, **35** a small semicircular prominence. Opposite the tragus **35** and separated from it by the deep curvature of the intertragic notch **37** is the antitragus **39**.

6. The apparatus of claim 5 further comprising:

at least one support rib extending from the upper surface of the ear cushion along a surface of the foam member to the concha stabilizer pad.

7. The apparatus of the claim 1 wherein the receiver attachment comprises:

a curved flexible arch having integral retaining members for coupling to the receiver, and further having a top portion extending between the retaining members and coupled to and supporting the concha stabilizer pad.

8. The apparatus of claim 1 wherein the concha stabilizer pad is formed as a torus.

9. An apparatus for stabilizing a headset including a receiver sized to fit between a tragus and an anti-tragus of an ear, the apparatus comprising:

an ear cushion dimensioned to cover a portion of the receiver disposed between the tragus and the anti-tragus;

a flexible support member extending from an upper surface of the ear cushion towards an upper concha of the ear; and

a concha stabilizer pad coupled to the support member at a hinge point for flexing the concha stabilizer pad toward the support member, and having a concha contact point for resting against the upper concha, the support member capable of bending at the hinge point to conform to a size and shape of the upper concha.

10. The apparatus of claim 9 comprising at least one support rib extending from an upper surface of the ear cushion along a surface of the support member to the concha stabilizer pad.

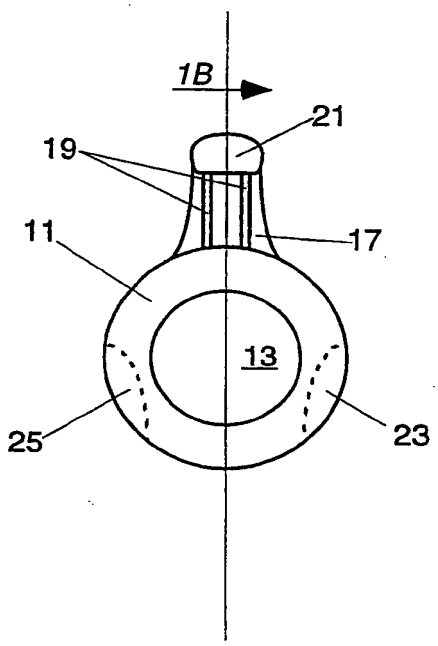


FIGURE 1A

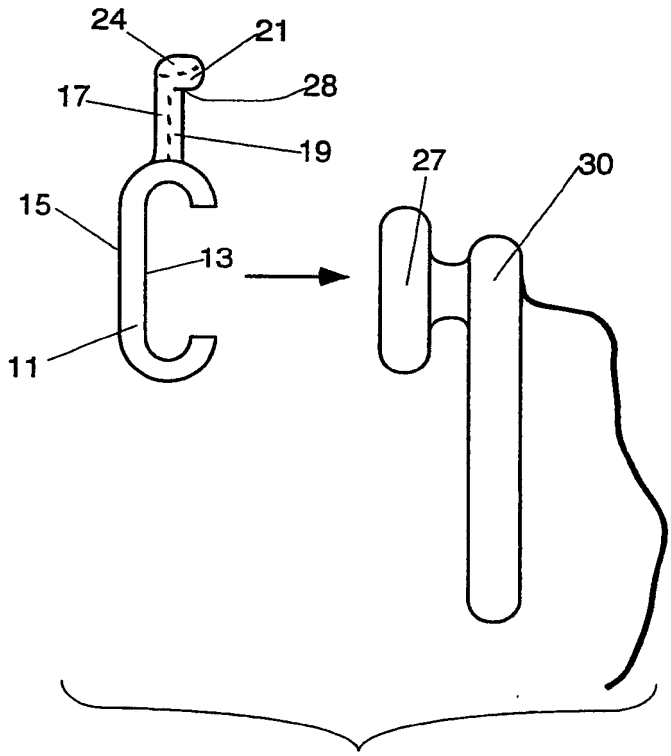


FIGURE 1B

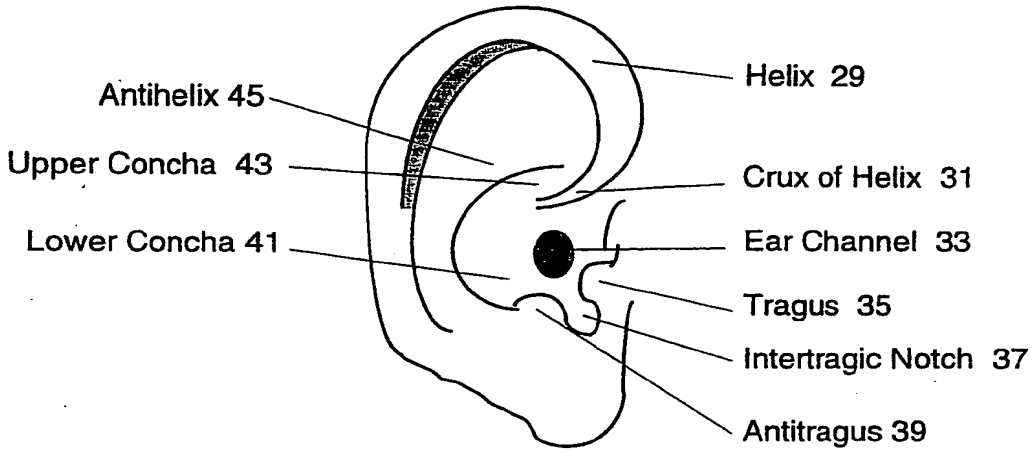


FIGURE 3

INTERNATIONAL SEARCH REPORT

Inter nal Application No
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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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